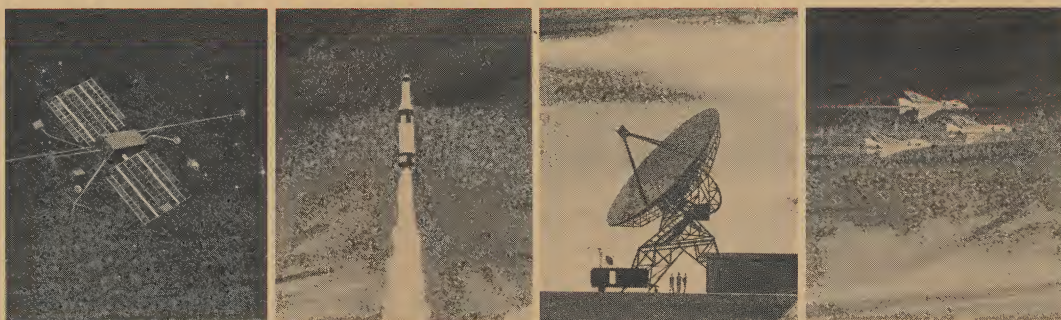




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# SYSTEM-285

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## HIGH-SPEED PRECISION CRT RECORDER, SYSTEM-285

Records high-frequency data in real time by combining images from a high-resolution cathode-ray tube with galvanometer traces onto a single, large-scale, recording surface ... thus providing a record that is both permanent and detailed for data analysis that was heretofore impossible.

Suits wide range of applications such as signal analysis / pulse rate or shape analysis / high-frequency vibration analysis / high-frequency phenomena display / telemetry signal analysis / radar data visual recording / co-ordinated time-base display / facsimile and video recording.

**ANOTHER INTERSTATE PRECISION INSTRUMENT**



## FEATURES:

- ☐ Combines magnified images from high-resolution cathode-ray tube and conventional galvanometers for high-frequency data presentation
- ☐ Records at spot-image speeds as high as 200,000 inches-per-second on 12-inch wide film or paper
- ☐ Provides resolution of 500-line pairs per 10 inches of recording media
- ☐ Available auxiliary modules adapt this unit to a wide range of applications
- ☐ Cathode-ray tube record is linear and undistorted to 20 kc in the swept axis.
- ☐ CRT is intensity modulated by a 4-mc video amplifier, making it useful to 30-ips paper speed with a spot size of less than 4 mils for maximum versatility
- ☐ Designed for visual monitoring of the tube face while recording
- ☐ Record identification included

## APPLICATIONS:

Depending on the auxiliary equipment used, the SYSTEM-285 can provide — in direct readout form — an extremely accurate method of:

- ☐ Signal Analysis
- ☐ Pulse-Rate or Pulse-Shape Analysis
- ☐ Telemetry Signal Analysis
- ☐ High-Frequency Vibration Analysis
- ☐ High-Frequency Phenomena Display
- ☐ Radar Data Visual Recording
- ☐ Co-ordinated Time-Base Display
- ☐ Facsimile and Video Recording

## GENERAL DESCRIPTION :

# SYSTEM 285

The precision, high-speed SYSTEM-285 combines magnified images from a high resolution cathode-ray tube with traces from conventional galvanometers, and records the combined data onto a single moving medium, such as film or light-sensitive paper. The record is made over the large surface of this medium which is 12 inches wide and can be moved at various drive speeds.

The SYSTEM-285 incorporates a high-intensity, high-resolution cathode-ray tube with a precision optical system that allows the precise, synchronized recording of the video data and galvanometer output onto the moving recording medium. This design makes possible a new order of high-frequency data analysis and preserves the output for permanent record.

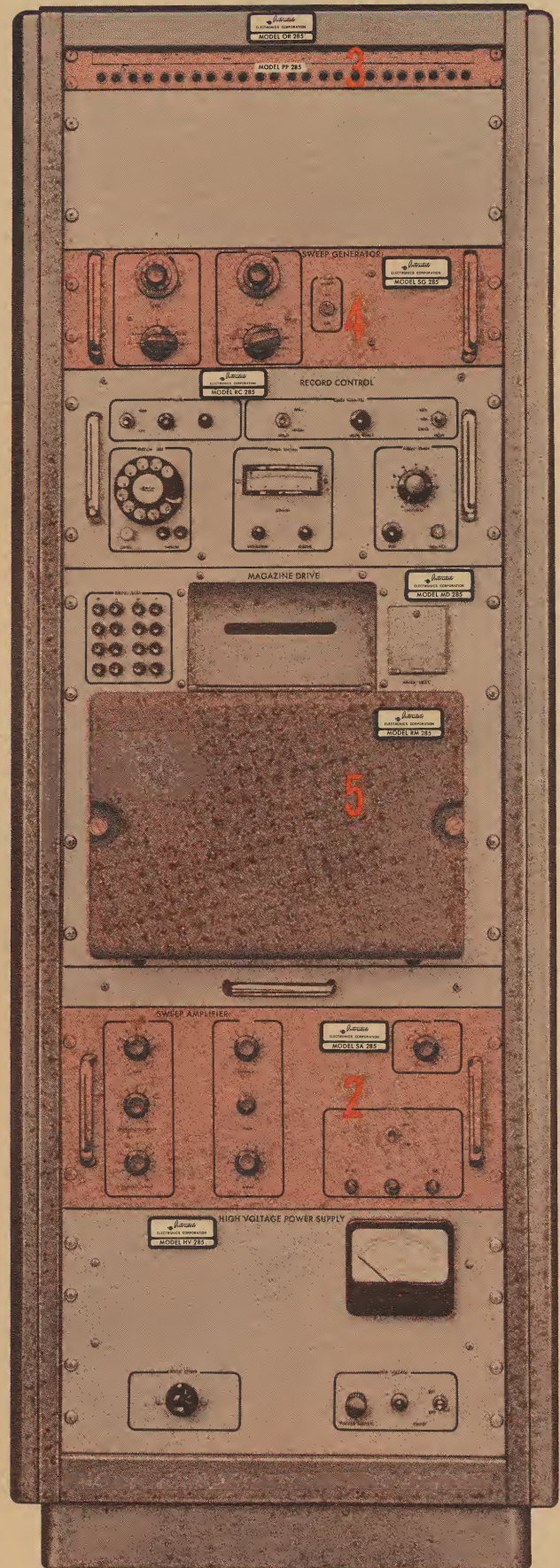
A highly precise instrument, the SYSTEM-285 records (on the medium) at spot speeds up to 200,000 inches-per-second. Its cathode-ray tube record is linear and undistorted to 20 kc in the swept axis. Projected resolution is 500 line pairs per 10 inches of film or paper.

The SYSTEM-285's video amplifier controls the CRT grid for intensity modulation or intensity blanking of the CRT beam. The CRT is intensity modulated by a 4-mc video amplifier, making it useful to 30-ips paper speed with a spot size of less than 4 mils.

Conventional oscillographic recording magazines, available in models for either internal or external development of the recorded image, are used with the SYSTEM-285. An auxiliary viewing mirror and viewing slot allow visual monitoring of the tube face during recording.

The SYSTEM-285 holds up to 8 conventional galvanometers. It also provides a method of record identification by pulse coding one of the galvanometer traces.

## SPECIFICATIONS:





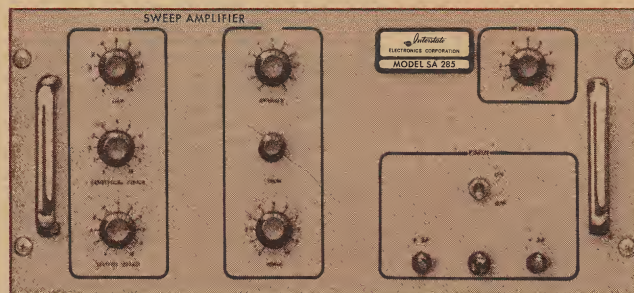
## 1 Basic OR285—Precision CRT Recorder

### Specifications

|                                                              |                                                                                                                                           |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| CRT Sweep Presentation                                       |                                                                                                                                           |
| Width                                                        | 9" nominal                                                                                                                                |
| CRT Record Resolution                                        | * 600 signal elements per sweep minimum                                                                                                   |
| Galvo Presentation Width                                     | 1 1/8" nominal per galvo                                                                                                                  |
| Cathode Ray Tube                                             |                                                                                                                                           |
| Type                                                         | IEC No. 9280526                                                                                                                           |
| Size                                                         | 5" diameter, 4 3/4" flat surface, high intensity, Phosphor Type P-11                                                                      |
| Optical System                                               |                                                                                                                                           |
| Lens                                                         | Schneider Componar F4.5. Focal Length 135 MM. Resolution 40 line pairs per MM                                                             |
| Mirror                                                       | Optically flat, front surfaced and ruggedized                                                                                             |
| Galvanometers                                                |                                                                                                                                           |
| Block                                                        | Midwestern Instruments, 8 galvos maximum                                                                                                  |
| Type (Not included)                                          | Any standard pencil galvo 5 1/2" focal length                                                                                             |
| Magazine Drive Linkage                                       | Flexible coupling and timing belt to minimize vibration                                                                                   |
| Recording Media                                              | Paper or film, 12" wide                                                                                                                   |
| Magazine (Not included)                                      | IEC RM285                                                                                                                                 |
| Drive Speeds                                                 | 0.16 ips to 160 ips normal. 0.03 ips to 30 ips optional. Other ranges on special order.                                                   |
| Power Requirements                                           | 115vac, 60 cps, 450 watts                                                                                                                 |
| Configuration                                                | All equipment front panel mounted in standard 69" high, 24" wide, and 24" deep cabinet. Space provided for SG285, SA285, RM285, and PP285 |
| Aux. CRT Grid Input (Used for Video Input External Blanking) |                                                                                                                                           |
| Input Impedance                                              | 3K ohms in series w/.047 $\mu$ f                                                                                                          |
| Polarity                                                     | Negative blanking, -3v to -7v max.                                                                                                        |
| Video Amplifiers                                             |                                                                                                                                           |
| Input Impedance                                              | 1K ohm                                                                                                                                    |
| Video Drive                                                  | 0.1v peak-to-peak, min.                                                                                                                   |
| Video Bandwidth                                              | dc to 4 mc $\pm$ 3 db                                                                                                                     |
| Video Polarity                                               | Positive for unblanking, +10v max.                                                                                                        |

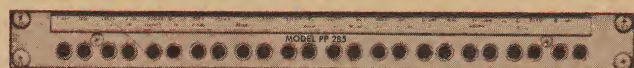
\*600 Line Pairs on photo paper. Film offers even greater resolution.

## SA285—Horizontal Sweep Amplifier



|                 |                                                                                                 |
|-----------------|-------------------------------------------------------------------------------------------------|
| Input Impedance | 10K ohms                                                                                        |
| Sweep Drive     | 10v peak-to-peak                                                                                |
| Sweep Polarity  | Positive ramp                                                                                   |
| Sweep Range     | dc to 20 kc (Useable to 30 kc)                                                                  |
| Fly-Back Time   | Less than 20 microsec.                                                                          |
| Linearity       | $\pm$ 1% or better                                                                              |
| Blanking        | Internal blanking provided with SG285. External blanking required with external sweep generator |
| Controls        | Calibrated for resettability                                                                    |
| Mounting        | Standard rack and panel                                                                         |

## PP285—Video Patch Panel (OPTIONAL)



Coaxial 24 terminal for all input and monitoring signals. Patch accepts BNC connectors from rear. Nine spare positions and patch cords provided. Fits in SYSTEM-285 rack.

## SG285—Horizontal Sweep Generator (OPTIONAL)



|                             |                                                                                                                                                                                                                                                                                                        |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range                       | 7 Steps:<br>(1) 30 microsec. to 100 microsec.<br>(2) 100 microsec. to 300 microsec.<br>(3) 300 microsec. to 1 millisecc.<br>(4) 1 millisecc. to 3 millisecc.<br>(5) 3 millisecc. to 10 millisecc.<br>(6) 10 millisecc. to 30 millisecc.<br>(7) 30 millisecc. to 100 millisecc.                         |
| Vernier Adjustment          | 10 turn hi-resolution potentiometer gives vernier adjustment on each band. Full scale setting on each band accurate to $\pm$ 5%                                                                                                                                                                        |
| Sweep Linearity             | $\pm$ 0.5%                                                                                                                                                                                                                                                                                             |
| Sweep Output                | Nominal 10v across 1K ohms                                                                                                                                                                                                                                                                             |
| Sweep Polarity              | Positive ramp                                                                                                                                                                                                                                                                                          |
| Sweep Mode                  | Triggered or free running with delayed sweep                                                                                                                                                                                                                                                           |
| External Sweep Trigger      | Negative polarity min. 5v. Zero to peak rise time, 1.0 microsec. or less                                                                                                                                                                                                                               |
| Sweep Delay Range (8 Steps) | (1) 10 microsec. to 30 microsec.<br>(2) 30 microsec. to 100 microsec.<br>(3) 100 microsec. to 300 microsec.<br>(4) 300 microsec. to 1 millisecc.<br>(5) 1 millisecc. to 3 millisecc.<br>(6) 3 millisecc. to 10 millisecc.<br>(7) 10 millisecc. to 30 millisecc.<br>(8) 30 millisecc. to 100 millisecc. |
| Vernier Adjustment          | 10 turn hi-resolution potentiometer gives vernier adjustment within each band. Full scale on each band accurate to $\pm$ 5%                                                                                                                                                                            |
| Delay Resettability         | To 0.5%                                                                                                                                                                                                                                                                                                |
| Delay Jitter                | $\pm$ 0.3% or less                                                                                                                                                                                                                                                                                     |
| Delay Mode                  | Triggered or free running with sweep generator                                                                                                                                                                                                                                                         |
| External Delay Trigger      | Negative polarity, 5v peak-to-peak. Rise time, 1.0 microsec. or less                                                                                                                                                                                                                                   |
| Sweep Resettability         | To 0.5%                                                                                                                                                                                                                                                                                                |

## RM285—Recording Magazine (OPTIONAL)



CEC Type 5-006A, modified for use with SYSTEM-285. Motor driven by magazine drive assembly in SYSTEM-285.

All specifications subject to change without notice.



## THEORY OF OPERATION

The SYSTEM-285 Precision CRT Recorder records (on a continuous roll of 12-inch wide and 400-foot long photo-sensitive paper or film) the trace image obtained from an intensity-modulated, cathode-ray tube beam which is deflected along the horizontal axis only.

The result is a composite made up of individual horizontal lines created by the sweep signal on which a second dimension is imposed by the longitudinal motion of the recording material. Video information, applied as the beam intensity modulating signal, can thus be displayed as dots of light and dark areas on individual sweep traces.

When the optional Patch Panel is used (PP 285), all CRT signal selection and distribution is accomplished at this panel where video drive, trace blanking, horizontal deflection (sweep) and sweep trigger signals are available. Without the Patch Panel option, all CRT signal interconnections are made at jacks located on the rear of individual chassis.

Incoming video signals can be applied to the CRT grid or cathode for intensity modulation of the trace beam.

A sweep signal which drives the horizontal deflection coil is generated by an optional Sweep Generator (SG 285) or it can be generated externally. The signal is applied to the coil through the Sweep Amplifier (SA 285). In the Sweep Amplifier are the primary CRT electronic circuits—cathode video driver, deflection amplifier, trace intensity, focus and centering controls and two low-voltage power supply modules.

An optional, portable interchangeable Recording Magazine

(RM 285) contains a roll of photosensitive paper or film. The light beam from the face of the CRT is magnified and focused for projection through a narrow slot on this recording magazine. The photosensitive material in the light-tight recording magazine is transported past the aperture where it is exposed to the trace image...providing a permanent, high-resolution record of high-frequency video information.

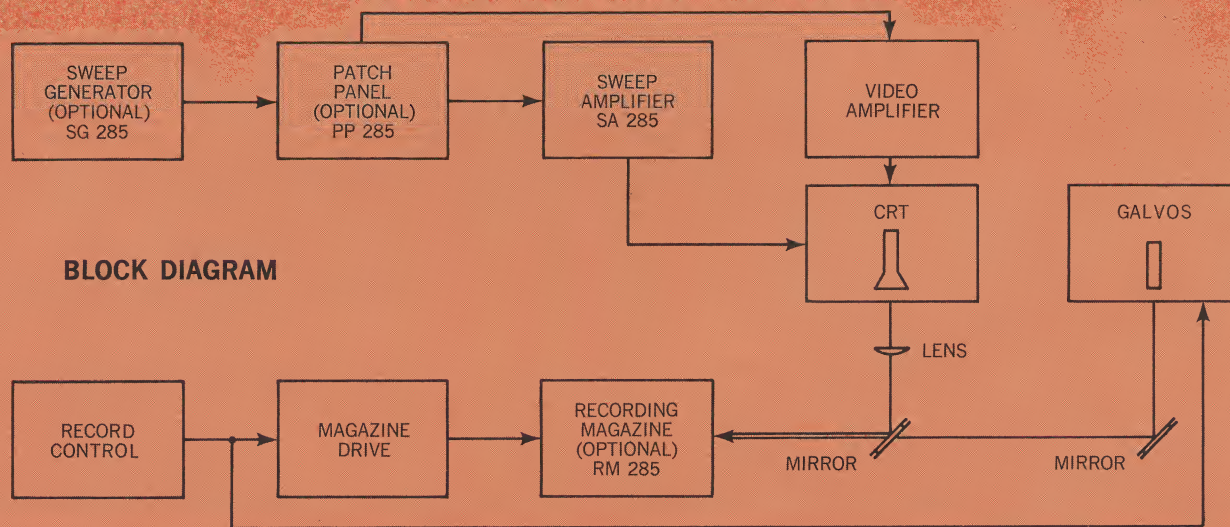
The SYSTEM-285's cathode-ray tube employs precision electromagnetic deflection. The housing is provided with alternate laminations of a special magnetic shielding material, to protect the electron beam from deflection by stray magnetic fields.

The cathode-ray tube has a clear, flat, non-browning face. It uses P-11 phosphor for generation of the visible trace. This phosphor provides a short-persistence, blue trace as required for high-efficiency photographic recording.

A built-in galvanometer trace recording capability ensures record identification or recording of supplementary analog data. The galvo trace is directed to the recording magazine aperture for recording alongside the cathode-ray tube trace.

The galvanometer optical path originates at the galvanometer lamp located at the base of the path enclosure. The light beam is projected upward to mirrors on each galvanometer. The galvanometer mirrors reflect the light downward to a fixed mirror which directs the light beam through a collimation lens and on to the surface of the photosensitive material in the recording magazine. A trace recording is thus obtained whose fluctuations reflect fluctuations in the applied electrical signal.

**BLOCK DIAGRAM**



For sales engineering consultation, contact your local representative or IEC Anaheim

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Thank you for your interest in our company. We are enclosing the specific data you requested which describes our products in some detail.

The Interstate Electronics Regional Office serving your area is:

Interstate Electronics Corporation  
Suite 506 - Paramount Building  
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Washington, D. C. 20006

We are informing Mr. James R. Casserly, of that Regional Office, of your interest. His office is staffed with people technically qualified to discuss your problem in detail. Please feel free to contact him for assistance.

Thank you again for your interest in our company and our products. We are looking forward to serving you.

Very truly yours,

INTERSTATE ELECTRONICS CORPORATION

John H. Clark  
Marketing Manager  
Data Products Division

JHC:lm

Enclosure